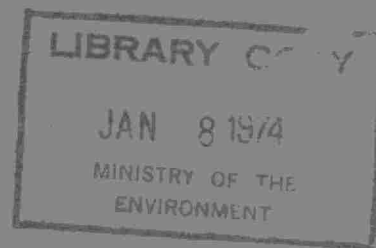


OPERATING SUMMARY

MOOSONEE



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Ontario

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Ministry of the  
Environment

135 St. Clair Avenue West  
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant and water supply system serving your community.

This summary contains data on the performance of the plants as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, through their day-to-day involvement with the operation, are thoroughly familiar with the plants.

We appreciate your continuing interest in protecting both the environment through efficient operation of the wastewater treatment facility and the well-being of the community through the provision of an adequate supply of safe potable water.

D.S. Caverly,  
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,  
Director,  
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

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OPERATIONS ENGINEER  
J. Wesno

135 St. Clair Avenue West  
Toronto 195

MOOSONEE  
WATER SUPPLY SYSTEM  
and  
WATER POLLUTION CONTROL PLANT

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

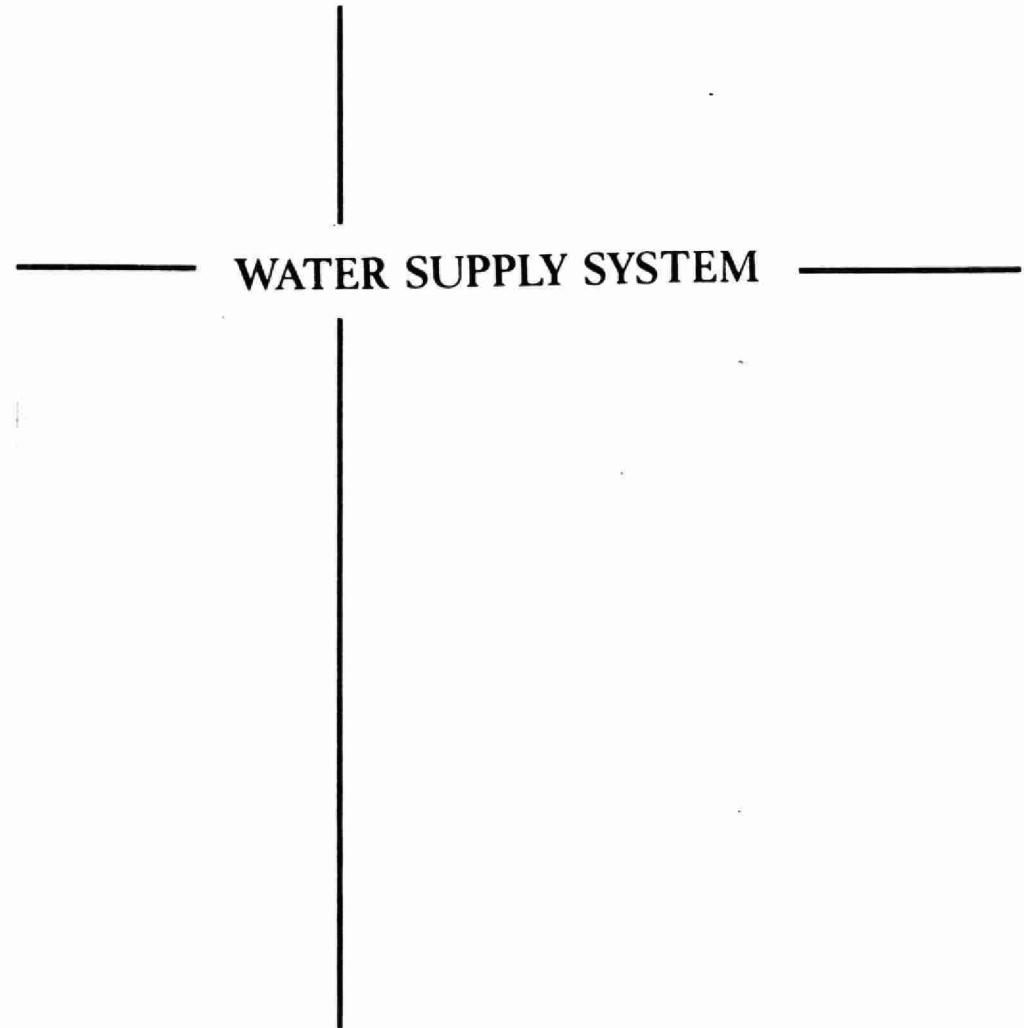
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## WATER SUPPLY SYSTEM

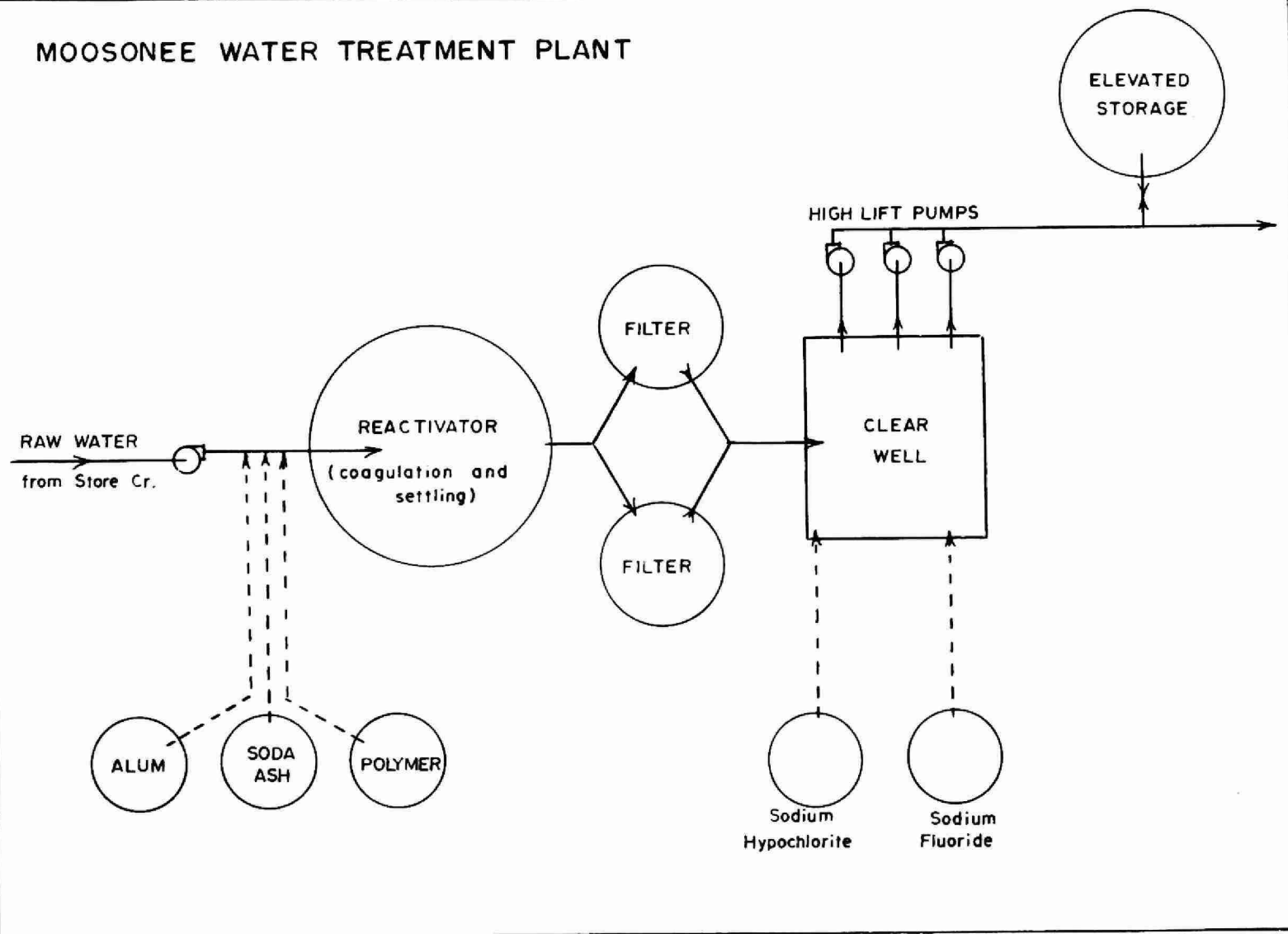
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## WATER POLLUTION CONTROL PLANT

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# MOOSONEE WATER TREATMENT PLANT



# DESIGN DATA

PROJECT NO. 5-0004-66  
NOMINAL CAPACITY 150,000 IGPD  
RAW SOURCE Store Creek

## INTAKE

Steel plate guard cage  
1" Steel pipe spacers  
Pipe 36' of 8" dia. to raw water well

## LOW LIFT PUMPS

2 (in raw water well)  
Type: Pleuger  
Rate: 145 IGPM @ 72' head

## FILTRATION

Type: 2 monovalve filter units -  
Graver 2 compartment  
Size: Ht. 10'6", dia. 6'  
Rate: 1.9 gpm/sq. ft. 53 gpm per filter  
Backwash: Adjustable: 170 igpm  
12 igpm/sq. ft.

## REACTIVATOR - One

Type: Graver, 3 stage (mixing, flocculation & sedimentation)  
Size: 14' dia.  
Rise Rate: 1.0 gal/sq. ft. rise area  
Detention Time: 114 min.  
Including: variable speed recirculator  
positive sludge scraper

HIGH LIFT PUMPS - 3 (in plant building)  
Type: Layne & Bowler, 3 stage  
Rate: 150 US gpm @ 150' TDH Layne

## CHLORINATION

Type: One Wallace & Tiernan V-notch dual head pump  
Rate: 30 ppm (12% Sodium hypochlorite)  
Tank Size: 30" x 4.0' - 115 gal.

## CHEMICAL FEED EQUIPMENT for

Alum, soda ash & coagulant aid (separan NP10)  
a) one neptune 3" crest meter  
b) feed tanks - 2 42' dia x 4'0" (soda ash & alum)  
1 30" dia x 4'0" (separan)  
c) 6  $\frac{1}{4}$  h.p. agitators  
d) pumps: one W&T single head, separan  
two W&T dual head, alum

## FLUORIDATION

Type: BIF chemo-feeder  
Rate: 1 ppm Hydrofluorosilic acid @ 25%

## STORAGE:

Town elevated tank: 50,000 gal  
Clear Water Well: 55,000 gal  
Raw Water Well: 72' dia - same level as creek

## SCREENING

Type: Stationary  
Size:  $\frac{1}{4}$ " holes, 4' x 4'



# '72 Review

## GENERAL

The Moosonee Water Treatment Plant has a design capacity of 150,000 gallons per day. Treatment consists of coarse screening, flocculation, sedimentation, sand filtration and chlorination. Raw water is taken from Store Creek. The project is operated by a chief operator and an operator who divide their duties between this project and the sewage treatment plant.

During the year, one of the low lift pump motors burnt out and was replaced.

A safety railing was installed on the reactivator.

The boiler for heating water in the elevated tank was replaced in October as a result of a severe corrosion problem which has since been corrected.

The filter underdrain elements were cleaned. Plugging of the elements resulted from a buildup of a rust-like scale on them.

## PLANT FLOWS

During 1972, the average daily flow was 109,000 gallons representing 73 percent of the plant's design capacity and a 25 percent increase over 1971. The average daily flow during the winter was considerably greater and exceeded the design capacity of the plant in March and April during which time, raw water was blended with treated water.

The high water demand during these periods was due to the continuous running of domestic water taps (including community taps) to prevent individual service laterals from freezing and due also to a number of water main breaks and hydrant leaks.

## CHEMICAL TREATMENT

The average chemical addition during the year was 99.6 mg/l Alum, 0.8 mg/l Separan, 0.40 mg/l fluosilicic acid as F, 2.9 mg/l sodium hypochlorite as Cl and 58.1 mg/l Soda Ash.

The average fluoride concentration and chlorine residual in the treated water were respectively 0.4 mg/l and 0.5 mg/l. The low fluoride strengths were due to an operating error which has since been corrected.

The average iron concentration of the treated water was .09 mg/l which is well within the Ministry's allowable limit of 0.3 mg/l.

The average turbidity of the treated water was 2.5 and the average colour was 6 apparent units.

#### OPERATING COSTS

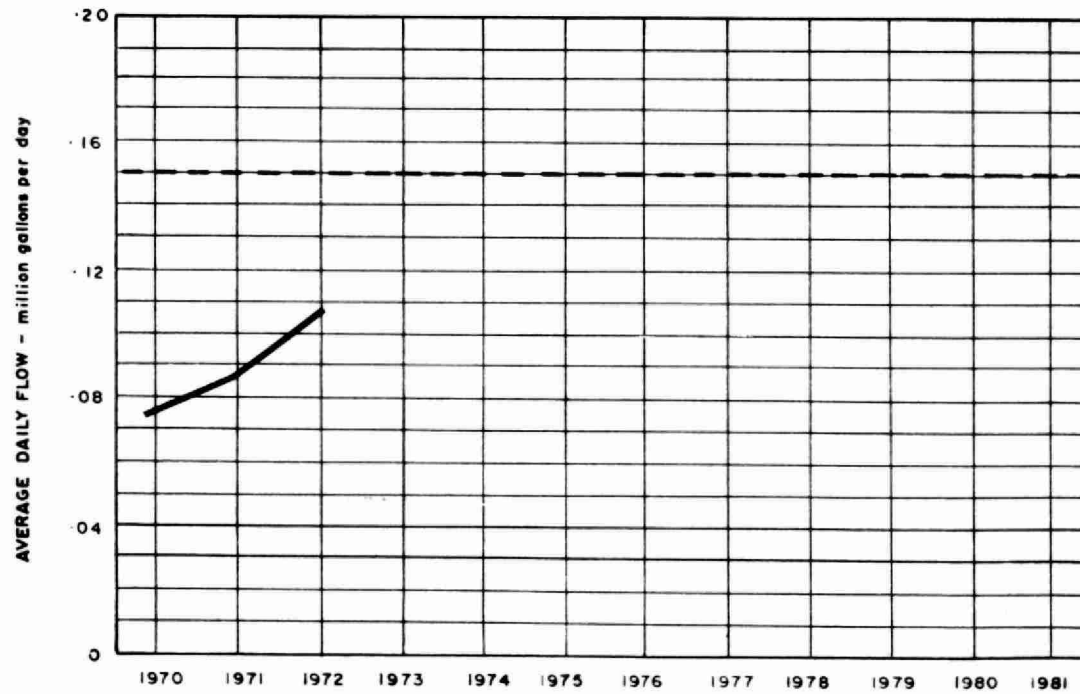
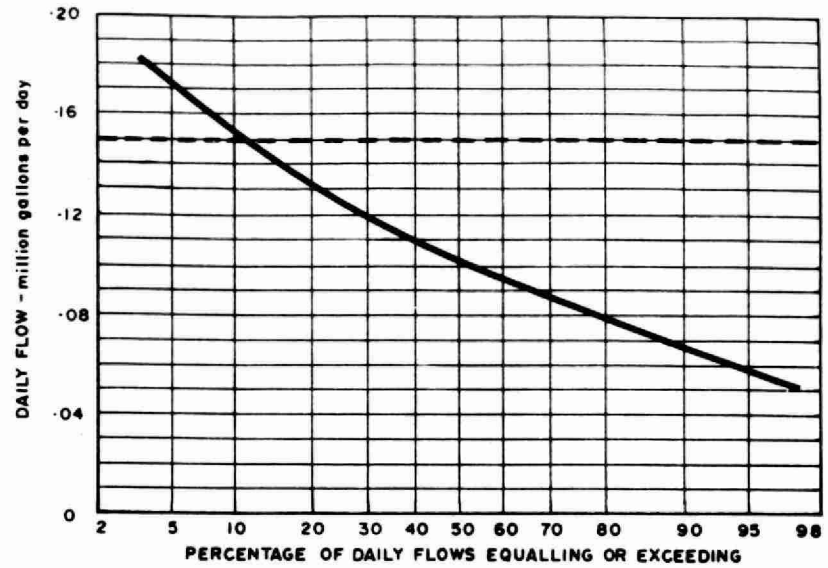
The total operating cost for the year was \$32,523.11. The major non-salary items were power at \$5,678.04, chemicals at \$5,191.45 and equipment at \$4,961.63.

#### CONCLUSIONS

The general operation of this plant was satisfactory, producing a good quality water supply.

It was necessary to blend raw water with treated water for two months during the winter. This was due to numerous main and hydrant breaks and the running of taps to prevent the freezing of services.

# FLOWS



DESIGN CAPACITY

## PLANT PERFORMANCE

MONTH	FLOWS				RAW WATER		TREATED WATER					
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	MAXIMUM RATE mgd	TURBIDITY (AVERAGE) JTU	COLOUR (AVERAGE) App. units	TURBIDITY		COLOUR		TEMPERATURE	
							AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
							JTU	JTU	App. units	App. units	° F	° F
JAN	3.96	.127	.192		1.5	99			10	50	34	34
FEB	4.19	.144	.168		5.0	71	3.0	4.0	7	30	34	34
MAR	5.04	.164	.193		3.5	55	4.0	4.0	6	10	34	34
APR	5.03	.168	.198		4.0	55	5.5	8.0	6	20	35	36
MAY	3.93	.127	.167		4.0	127	1.0	1.0	6	10	39	50
JUNE	2.75	.092	.142			154	1.0	1.0	5	5	51	61
JULY	2.36	.076	.123		9.0	159			5	5	56	62
AUG	2.27	.073	.081		8.0	219	4.0	4.0	5	5	56	60
SEPT	2.16	.072	.116		3.5	203	3.0	3.0	5	5	49	57
OCT	2.34	.076	.107		5.0	191	1.0	1.0	6	15	39	45
NOV	2.35	.078	.109		2.7	170	1.3	1.0	5	10	34	35
DEC	3.57	.118	.143		6.0	138	1.0	1.0	7	20	33	34
TOTAL	39.95											
AVG.		.109	MAXIMUM .198	MAXIMUM	4.7	137	3.0	MAXIMUM 8.0	6	MAXIMUM 50	41	MAXIMUM 62

## CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	TOTAL AMOUNT OF SODIUM HYPOCHLORITE gallons	DOSAGE		RESIDUAL IN PLANT EFFLUENT mg/l
	0	1 - 3	4 - 32	33 - 320	> 320						PRE - mg/l	POST - mg/l	
JAN	2	0	0	0	0	2	0	1	0	80		2.4	.5
FEB	2	0	0	0	0	2	0	0	0	70		2.0	
MAR	2	0	0	0	0	2	0	0	0	60		1.4	
APR	1	0	1	0	0	2	1	0	0	70		1.7	.5
MAY	0	1	0	1	0	2	0	0	0	95		2.9	.6
JUNE	0	0	2	0	0	2	0	0	0	75		3.2	.5
JULY	0	0	0	1	0	1	0	0	0	80		4.1	.5
AUG	0	0	1	1	0	2	0	0	0	85		4.5	.5
SEPT	0	1	1	0	0	2	0	0	0	80		4.4	.5
OCT	0	0	0	1	0	1	0	0	0	80		4.1	.5
NOV	1	1	0	0	0	2	0	0	0	85		4.3	.5
DEC	1	0	0	0	0	1	0	0	0	90		3.0	.5
TOTAL	9	3	5	4	0	21	1	1	0	950			
AVG.	4.2 (NOTE - Average shown is the GEOMETRIC MEAN)									3 pounds per day		2.9	.5

## TREATMENT DATA

MONTH	CHEMICALS USED										FILTER OP <sub>U</sub>	
	A L U M		SEPARAN		SODA ASH		FLUOSILICIC ACID		REACTOR SODA ASH		AVERAGE	BACKWASH
	AMT. USED pounds	DOSE m g / l	AMT. USED pounds	DOSE m g / l	AMT. USED pounds	DOSE m g / l	AMT. USED gallons	DOSE m g / l F	AMT. USED pounds	DOSE m g / l	RUN HOURS	WATER mil. gal
JAN	3500	88.4	32	.8	2100	53.0	4	.35			8	.149
FEB	4200	100.1	30	.7	2100	50.1	3	.25			8	.139
MAR	4700	116.4	30	.6	2200	61.1	1	.06			14	.112
APR	4600	91.4	27	.5	1800	59.5	5	.34			24	.048
MAY	2900	75.7	23	.6	2100	53.4	5	.45	290	14.3	24	.050
JUNE	2800	101.7	27	1.0	1800	65.3	3	.38			24	.048
JULY	2700	114.2	28	1.2	1500	63.4	4	.59			20	.050
AUG	2500	110.3	30	1.3	1800	79.4	5	.77			20	.050
SEPT	2800	129.9	25	1.2	1800	83.5	5	.81			20	.048
OCT	3000	128.1	24	1.0	1900	81.1	5	.74			20	.050
NOV	2800	119.3	27	1.2	2000	85.2	5	.74			20	.048
DEC	3300	92.5	30	.8	2100	58.8	9	.88			20	.050
TOTAL	39800		333		23200		54		290			.842
AVG.	3317	99.6	28	.8	1933	58.1	5	.40		14.3	17	.070

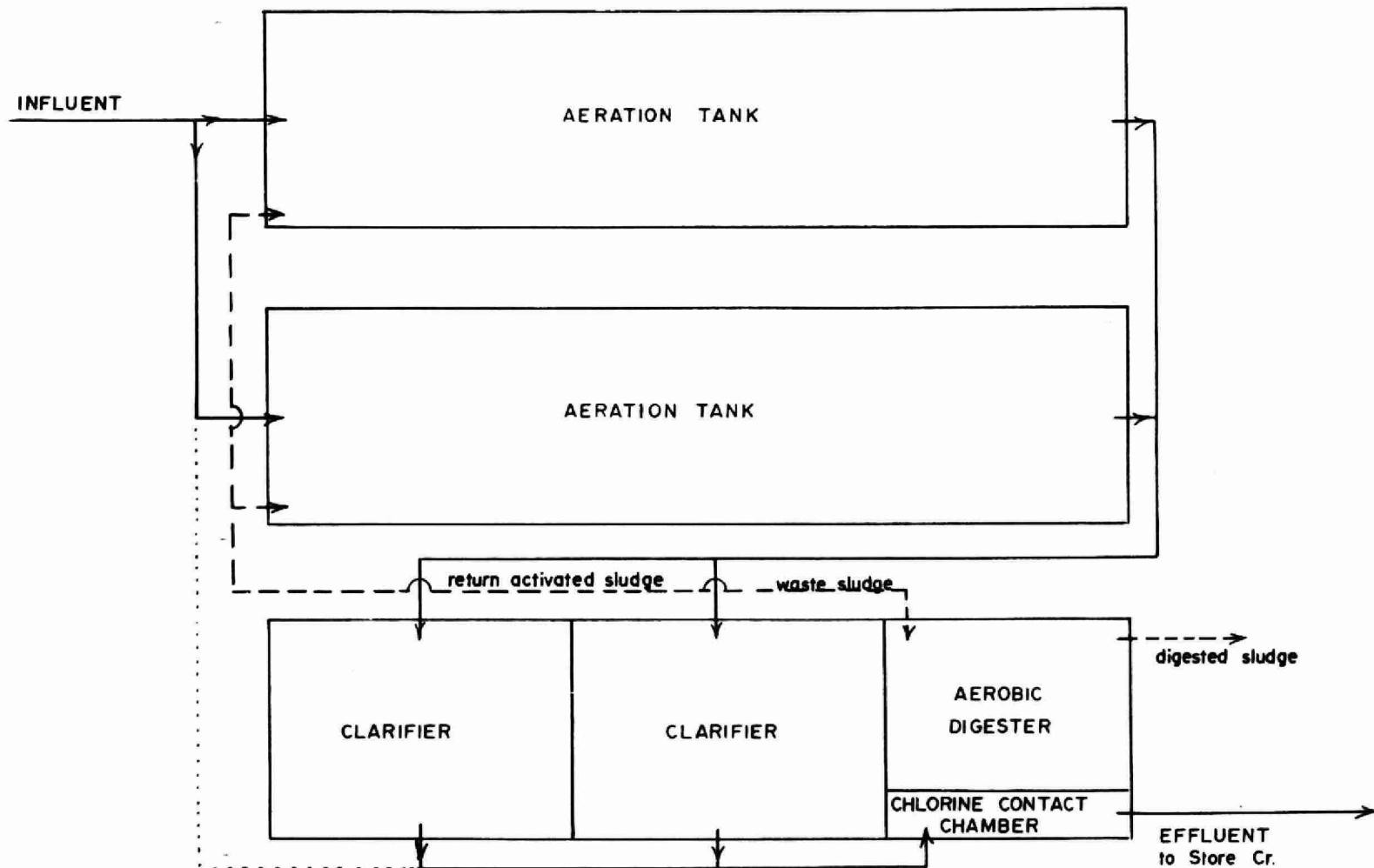
## WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as $\text{CaCO}_3$	20	156	330	26	20	160	322	24	80 - 100
ALKALINITY in mg/l as $\text{CaCO}_3$	20	134	288	26	20	145	288	50	30 - 100
IRON in mg/l Fe	20	.80	1.30	.50	20	.09	.30	< .05	Less than 0.3
CHLORIDE in mg/l $\text{Cl}^-$	14	124	313	7	14	132	316	9	Less than 250
pH in pH units	20	7.7	7.9	7.5	20	7.6	8.2	7.2	7.0 - 8.5
FLUORIDE in mg/l $\text{F}^-$	3	.2	.4	.1	371	.9	1.3	.3	Less than 1.2

— WATER POLLUTION CONTROL PLANT —



# MOOSONEE WATER POLLUTION CONTROL PLANT



PROJECT NO. 1-0002-66

TREATMENT Extended Aeration

DESIGN FLOW 75,000 l. gal/day

DESIGN POPULATION 1,000

BOD - Raw Sewage 254 mg/l  
- Removal 90%

SS - Raw Sewage 286 mg/l  
- Removal 85%

### PRELIMINARY TREATMENT

#### Comminution

Type: Chicago Pump Model 7B

### EXTENDED AERATION

#### Aeration Tanks

Type: Diffused air, single pass  
Size: Two 45.6' x 11' x 12'  
(12,000 ft<sup>3</sup> or 75,000 gal)  
Retention: 24 hours

#### Air Supply

Type: Hoffman  
Size: Two 312 cfm

#### Diffusers

Type: Shearusers  
Spacing: 22/tank @24" centres

#### Sedimentation

Type: Smith & Loveless  
Size: Two (18,400 gal)  
Retention: 5.9 hours  
Loading: Surface, 204 gal/ft<sup>2</sup>/day  
Weirs, 2250 gal/ft/day

### CHLORINATION

One W & T V-800 400 l.b/day

#### Chlorine Contact Chamber

Size: 2430 gal  
Retention: 48 minutes

### SLUDGE HANDLING

#### Digestion System - Aerobic

Size: 1140 ft<sup>3</sup> or 7100 gal  
Air Supply: 50 cfm  
Diffusers: 7 Shearusers

### OUTFALL

To Store Creek (at junction of  
Moose River)

# '72 Review

## GENERAL

The project consists of a secondary sewage treatment plant and three pumping stations. The plant is a prefabricated field erected unit designed to utilize either the contact stabilization process or extended aeration process. The plant has a capacity of 75,000 gpd using the extended aeration process and a capacity of 112,500 gallons per day using contact stabilization. It is presently being operated as an extended aeration plant. The plant is totally housed in an insulated metal building. The treated effluent is discharged to Store Creek.

The project is operated by a chief operator and an operator who divide their duties between this project and the water treatment plant.

During the year, permission was granted to the Moosonee Area Development Board to dispose of holding tank wastes into the sewage collector system upstream from the plant.

There were no major mechanical or process problems.

## PLANT FLOW & PROCESS

The average daily flow for the year was 44,000 gallons. The average raw sewage BOD and suspended solids concentrations were 127 mg/l and 148 mg/l respectively. The average BOD reduction was 75 percent and average suspended solids reduction was 86 percent. The final effluent concentrations were 32 mg/l BOD and 21 mg/l suspended solids.

## CHLORINATION

The final effluent was chlorinated from July 8 to November 30. A total of 393 gallons of sodium hypochlorite solution was used at an average chlorine dosage of 8.0 mg/l.

## AERATION

The average MLSS concentration of 4300 mg/l and the F/M ratio of 0.02 were within the accepted limits of good aeration process operation.

### EXPENDITURES

The total operating cost for the year was \$25,416.19. The major non-salary items were power at \$10,780.89 and fuel at \$1,395.08.

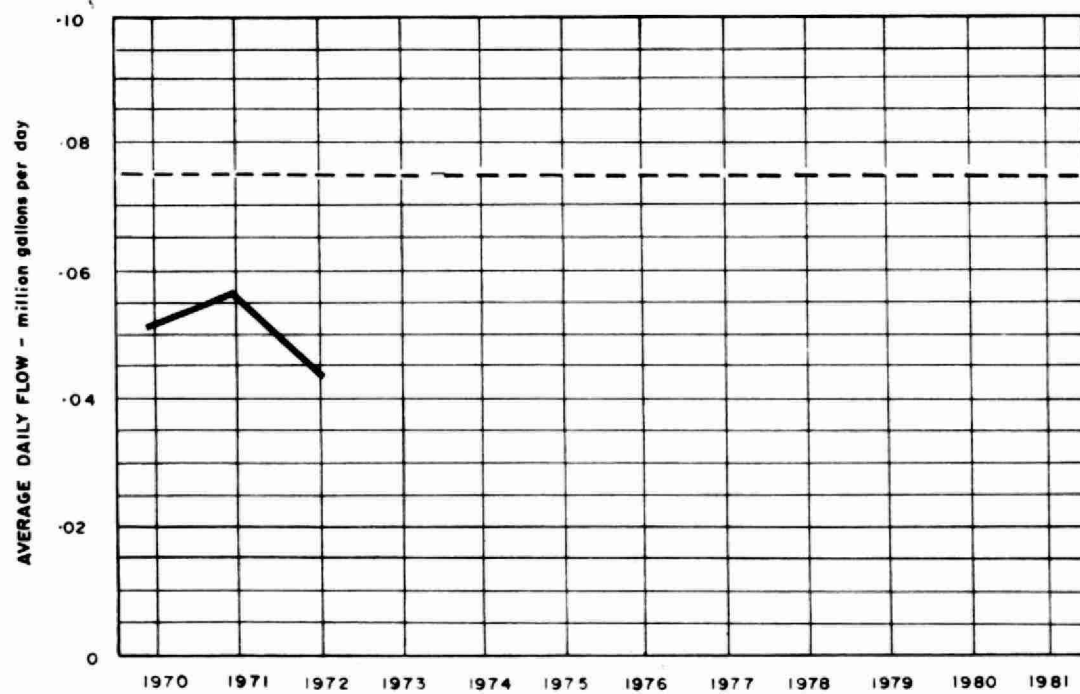
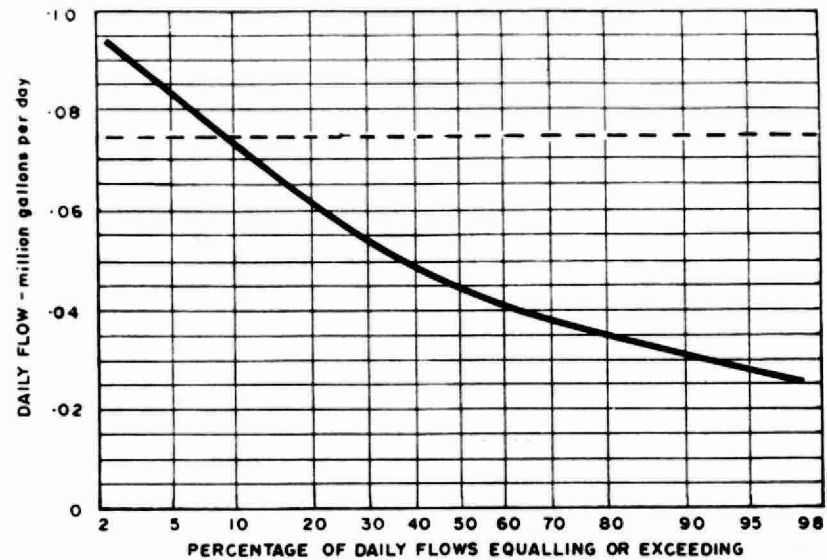
### SLUDGE DISPOSAL

The amount of aerobically digested sludge disposed of was minimal at approximately 400 gallons. The sludge was used as a lawn fertilizer on plant grounds.

### CONCLUSIONS

The general operation of the plant was satisfactory. It is anticipated that future process changes will improve the final effluent quality.

# FLOWS

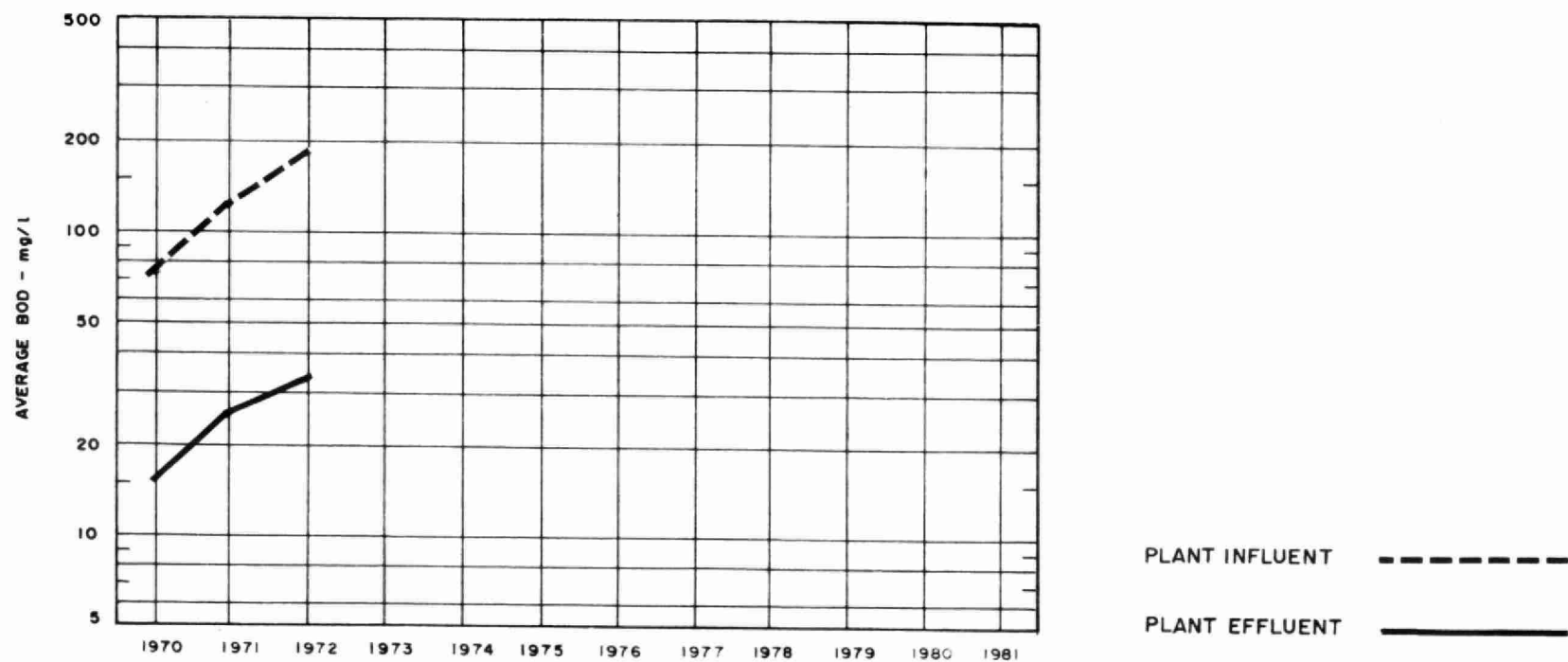
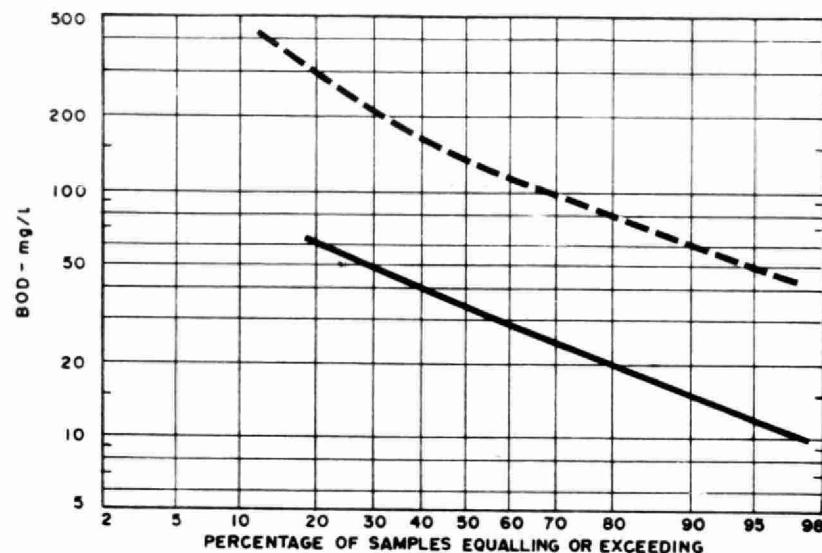


DESIGN CAPACITY — — — — —

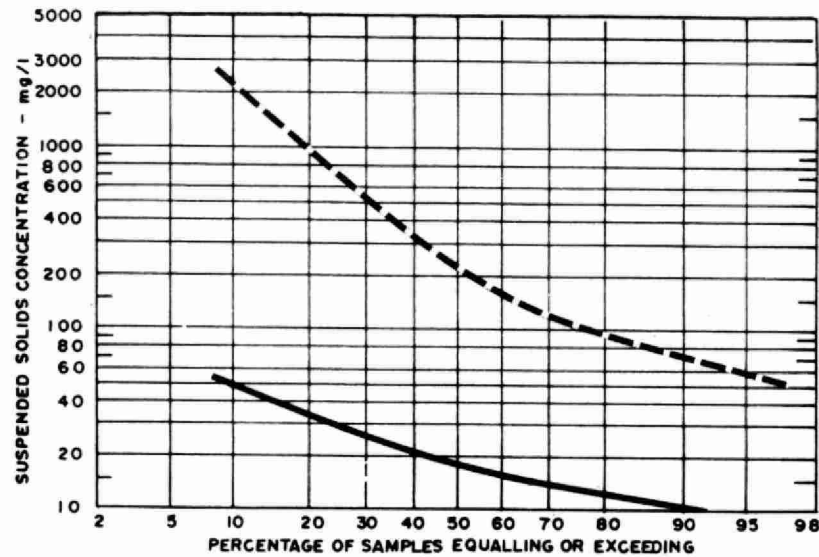
## PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 <sup>3</sup> pounds	mg/l	mg/l	%	10 <sup>3</sup> pounds	mg/l P	mg/l P
JAN	1.16	.037	.046	100	24	76	.9	110	20	82	1.0	8.2	4.6
FEB	1.05	.036	.048	120	57	53	.7	100	20	80	.8	8.9	5.8
MAR	1.44	.047	.056	73	53	27	.3	100	28	72	1.0	10.0	4.9
APR	2.25	.075	.101	68	21	69	1.1	280	13	95	6.0	5.2	2.7
MAY	1.88	.061	.107	430	27	94	7.6	930	22	98	17.0	11.4	4.5
JUNE	1.23	.030	.053	300	39	87	3.2	1065	30	97	12.7	13.0	4.6
JULY	1.10	.036	.051	160	46	71	1.3	120	20	83	1.1	11.0	6.0
AUG	1.21	.039	.053	127	18	86	1.3	110	10	91	1.2	10.7	4.9
SEPT	1.02	.033	.042	175	18	90	1.6	145	28	81	2.0	13.0	5.6
OCT	1.33	.042	.057	220	30	86	2.5	250	8	97	3.2	12.0	3.1
NOV	.97	.032	.045	210	24	89	1.8	415	30	93	3.7	16.0	4.9
DEC	1.38	.044	.052	90	20	78	1.0	140	30	79	1.5	11.0	5.1
TOTAL	16.01	-	-	-	-	-	23.3	-	-	-	51.2	-	-
AVG.		.044	MAXIMUM .107	181	32	82	1.9	341	21	94	4.2	11.0	4.8
No. of Samples	-	-	-	21	21	-	-	21	21	-	-	21	20

# BIOCHEMICAL OXYGEN DEMAND

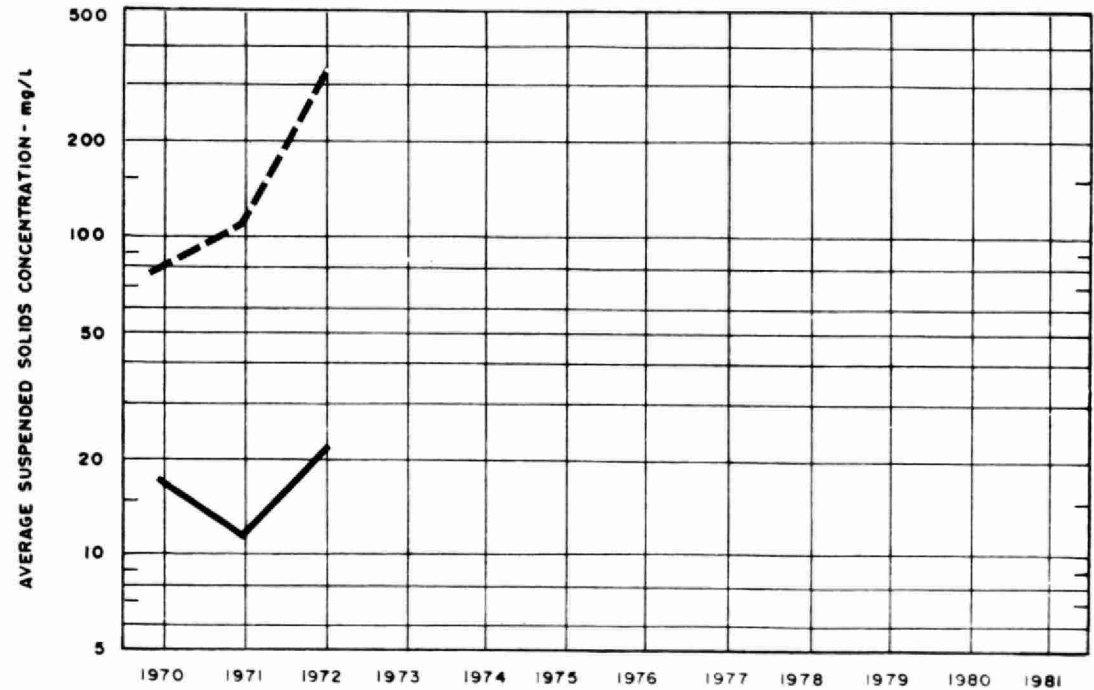


# SUSPENDED SOLIDS



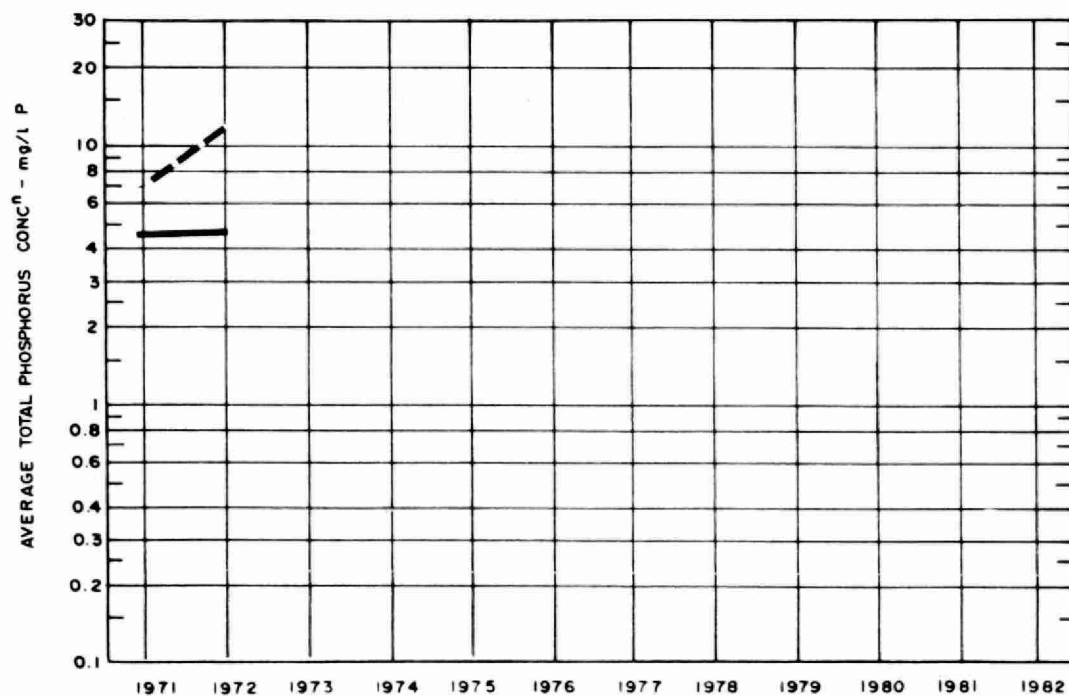
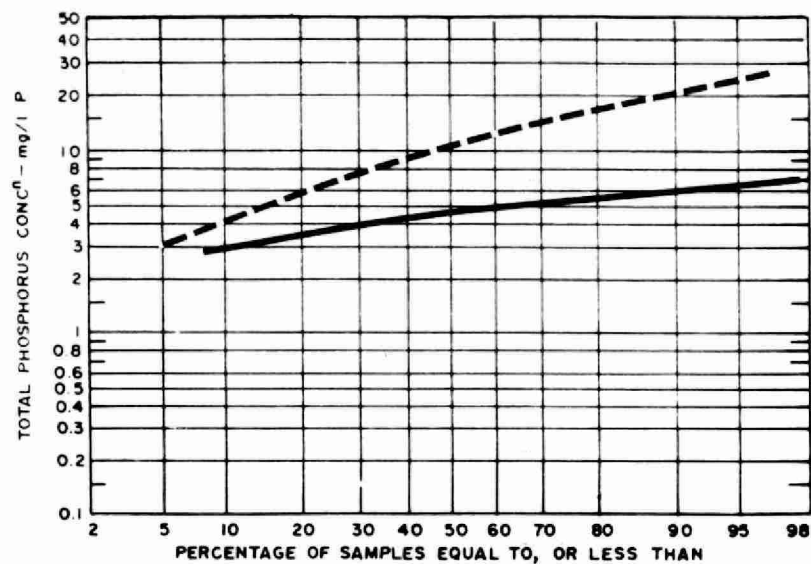
PLANT INFLUENT      - - - - -

PLANT EFFLUENT      \_\_\_\_\_





# PHOSPHORUS



PLANT INFLUENT

PLANT EFFLUENT

## TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED cubic feet	NaOCl USED gallons	AVG. DOSAGE mg/l	MLSS CONC mg/l	F/M day <sup>-1</sup>	AIR USED 1000 ft <sup>3</sup> lb BOD	QUANTITY 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN				3900	.02	6.7							
FEB				3200	.02	8.5							
MAR				3700	.02	20.8							
APR				3300	.03	5.3							
MAY				4100	.12	.7							
JUNE				4800	.04	2.2							
JULY		83	8.2	1700	.02	4.2							
AUG		80	7.3	5100	.02	3.2							
SEPT		75	8.1	4800	.04	1.8							
OCT.		85	7.1	6500	.05	1.5							
NOV		70	7.9	3300	.02	1.9		6600					
DEC						3.9							
TOTAL		393	-	-	-	-		-	-		-	-	
AVG.	cu. ft/mil gal	78	8.0	4300	.04	5.1		6600					

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